DEPARTMENT OF ENVIRONMENTAL QUALITY
PERMITTING and COMPLIANCE DIVISION
MONTANA POLLUTANT DISCHARGE ELIMINATION SYSTEM (MPDES)

Fact Sheet

PERMITTEE:	City of Whitefish
PERMIT NUMBER:	MT0020184
RECEIVING WATER:	Whitefish River
FACILITY INFORMATION:	
Name:	City of Whitefish Wastewater Treatment Plant (WWTP)
Location:	300 Monegan Road Whitefish, MT 59937
Mailing Address:	P.O. Box 158 Whitefish, MT 59937-0158
Contact:	Greg Acton, Utilities Superintendent
Telephone:	(406) 863-2451
FEE INFORMATION:	
Number of Outfalls:	1 (for fee determination purposes)
Type of Outfall:	001 – Major Mechanical POTW, no Pretreatment with Continuous Discharge to Surface Water

I. Permit Status

The current Montana Pollutant Discharge Elimination System (MPDES) permit for the City of Whitefish (City) Wastewater Treatment Plant (WWTP) became effective on June 1, 1996. It expired at midnight, March 31, 2001. In April 2000, the City submitted application short form 2A and the associated fees for renewal of the MPDES permit. In accordance with ARM 17.30.1313, the permit was administratively extended at that time. In March of 2006, a completed renewal application package consisting of DEQ Form 1 and EPA Form 2A with updated information was submitted at the Department's request.

II. Facility Information

A. Facility Description

The Whitefish WWTP serves the residents and businesses of the City of Whitefish and Big Mountain Sewer District, with a current service area population of approximately 5570 (renewal application, 2006). The facility is a 3-celled, aerated, bentonite-lined lagoon system built in 1979 with a design flow of 1.25 mgd (Design Criteria Morrison-Maierle, Inc. 1981, renewal application 2000). Mechanical tertiary treatment utilizing alum in a phosphorus removal clarifier was added in 1987.

The effluent is continuously discharged to the Whitefish River at Outfall 001. Currently, the facility is not equipped with effluent disinfection capabilities. The effluent pipe is equipped with a ductile iron, multi-port diffuser (15 ports on alternate sides with one foot centers) that extends 18 feet (approximately 2/3) across the river bed. The effluent diffuser periodically plugs, forcing all effluent to exit the end of the diffuser (MPDES Compliance Inspection July 5, 2007). The operator stated it had been at least three years since the diffuser was last manually cleaned.

A 2003 upgrade to the aeration system provided for an increased design flow of 1.8 mgd (Design Criteria Anderson/Montgomery Consulting Engineers, 2003, updated renewal application, 2006). However, no changes to the phosphorus clarifier were made during the upgrades and it is designed for 1.25 mgd average daily flow with peak flows of 1.85 mgd (Design Criteria Carver Engineering, Inc, 1988). A letter dated June 25, 2002 from the Department states that the plant design capacity is 1.25 mgd.

Since 1990, due to fouling of the original open channel flow meter, effluent flow measurements have been taken from the magmeter on the influent line to the phosphorus removal clarifier (end of cell #3). The influent flow magmeter installed in 2003 measures flow after all return lines.

The collection system was built as a combined sewer (archived administrative file and Operations and Maintenance (O & M) Manual, Morrison-Maierle, Inc, 1981). Since initial construction, the Whitefish WWTP collections system has had repeat Sanitary Sewer Overflow events (SSOs). Separation of the combined sewers was undertaken by the City in the late 1990's. However, with the easing of drought conditions in the Flathead Valley since 2002 and subdivision hook ups (DEQ compliance inspection, 2006) increased I/I have been observed by collections and WWTP personnel.

Inflow and Infiltration (I/I) flows are reported on the updated application to be 161, 095 gpd. Operations personnel have reported that influent flows can be more than four times the average design flow during storm events (MPDES Compliance Evaluation Inspection, 2006). The operators periodically divert flows in excess of approximately 1.8 mgd to one of the lined phase isolation cells of the original plant now used as a surge basin. The stored surge flows are then returned to the headworks during times of normal flow for further treatment. In June 2005, plant personnel diverted approximately six million gallons of effluent from the end of cell #3 to the surge basin in less than a two-day period due to rain that caused lift stations to fail, overwhelmed the collections system, and caused numerous SSOs (MPDES Compliance Evaluation Inspection, 2006).

The original facility utilized phase isolation cells to handle solids. By 1987, use of this system was discontinued. Currently, solids are removed from the phosphorus removal clarifier on a monthly basis and stored in one of the original facility's lined phase isolation cells. A Notice of Intent under EPA Region VIII Permit Number MTG650000, General Permit for Facilities/Operations that Generate, Treat, and/or Use/Dispose of Sewage Sludge by Means of Land Application, Landfill, and Surface Disposal Under the National Pollutant Discharge Elimination System was filed by the City in November 2006.

Table 1 is a summary of the City of Whitefish WWTP design criteria from the Morrison-Maierle, Inc. 1981 O&M Manual; Carver Engineering, Inc. Phosphorus Removal Clarifier O&M Manual 1988; and Anderson/Montgomery Consulting Engineers O&M Manual, 2003.

Table 1. Current Design Criteria Summary – Whitefish WWTP

Facility Description: Continuous discharge lagoon facility with 3 aerated cells, phosphorus removal clarifier and no disinfection capabilities.	
Construction Date**:** 1979	Modification Date: 1987 – phosphorus removal clarifier added. 2002 – upgraded lift stations and lagoon aeration capabilities, installed new influent flow meter
Upgraded Design Year: 2020	
1979 Design Population: 10,000	2005 Population Served: 5,570
Design Flow, Average (mgd): 1.25	Design Flow, Peak (mgd): 2.6
Minimum Detention Time (days): 27.2 at 1.25 mgd	
Design BOD Removal since 2003 (%): 85	Design BOD Load (lb/day): 1700
Design SS Removal since 2003 (%): 65	Design TSS Load (lb/day): 1984
Design TN Removal (%): NA	Design TN Load (lb/day): NA
Design TP Removal (%): NA	Design TP Load (lb/day): NA
Collection System: Combined [X] Separate [ ]	
SSO Events (Y/N): Y	Number: >14
Bypass Events(Y/N): Y	Number: one in June 2002, for facility upgrade
Inflow and Infiltration contribution (mgd): 0.1611 (application value) Per capita I/I based on Influent flow of 1.53 = 274 gpd	Source: storm water, subdivision hook ups, sump pumps, failing lift stations and sewer lines, shore line sewer pipes below the level of the lake.
Disinfection: No	Type: none
Discharge Method: Continuous	
Effluent Flow Primary Device: Parshall flume	
Effluent Secondary Flow Device: magmeter with totalizer	
Sludge Storage: physical (alum) sludge stored in phase isolation basin	
Sludge Disposal: land application	EPA Authorization Number: NOI submitted to EPA 11/26/06

B. Effluent Characteristics

A summary of the City of Whitefish 30-day average influent and effluent flow data for January 2003 through December 2006 is presented in Table 2. Effluent data is from the facility Discharge Monitoring Reports (DMR) for the Period of Record (POR) January 2002 through December 2006,

influent data is from the permittee (June 2007).

Table 2. Summary of Influent and Effluent 30-Day Average Flow Data for January 2003 through December 2006. (Bold values exceed plant design average flow.)

Month	2003		2004		2005		2006	
	Influent Flow (mgd)	Effluent Flow (mgd)	Influent Flow (mgd)	Effluent Flow (mgd)	Influent Flow (mgd)	Effluent Flow (mgd)	Influent Flow (mgd)	Effluent Flow (mgd)
January	0.652	0.668	0.660	0.716	0.780	0.834	**1.42**	**1.401**
February	0.708	0.734	0.786	0.766	0.828	0.887	1.2	1.162
March	0.927	1.056	1.08	1.198	0.943	0.913	**1.53**	**1.527**
April	0.972	0.929	1.02	0.983	1.02	1.173	**1.52**	**1.478**
May	0.594	0.905	0.7979	0.775	0.857	0.816	0.932	0.931
June	0.802	0.798	0.755	0.849	**1.51**	**1.354**	**1.37**	**1.291**
July	0.791	0.782	0.874	0.884	0.983	0.899	0.961	0.903
August	0.745	0.652	0.870	0.739	0.823	0.880	0.877	0.871
September	0.701	0.691	0.806	0.920	0.808	0.825	0.748	0.746
October	0.665	0.708	0.685	0.731	0.733	0.952	0.668	0.671
November	0.589	0.545	0.695	0.690	0.744	0.815	0.660	0.762
December	0.666	0.690	0.811	0.803	0.804	0.769	0.730	0.745
Minimum	0.589	0.545	0.660	0.690	0.733	0.769	0.660	0.671
Maximum	0.972	1.056	1.02	1.198	**1.51**	**1.354**	**1.53**	**1.527**

Review of the effluent flow data for Outfall 001 shows:

- DMR 30-day average discharge flow values exceeded the average design flow of 1.25 mgd five times in the POR, of which four exceedences occurred since January 2006.
- DMR daily maximum discharge flow values exceeded the phosphorus removal clarifier peak flow value of 1.8 mgd three times in the POR all of which occurred since January 2006.
- DMR daily maximum discharge flow values exceeded the average phosphorus removal clarifier design flow of 1.25 mgd 15 times, with six occurrences since January 2006.
- Both influent and effluent flows show increasing trend over the POR.
- The wet months of April through June 2006 show influent flows at nearly twice the level of the dry months. This is indicative of inflow and infiltration (I/I).
- Per capita flow contributions to the POTW approximate 274 gallons per day (maximum reported influent flow in 2006 divided by population served).

Effluent data from the facility DMRs for the POR January 2002 through February 2007 are summarized in Table 3**.**

Table 3: DMR Effluent Characteristics [1] for POR June 2001 through September 2006

Parameter	Location	Units	Previous Permit Limit (7-d/30-d)	Minimum 30-Day Value	Maximum 30-Day Value	Average 30-Day Value	Number of Samples
Flow, Daily Average	Effluent	mgd	[2]	0.397	1.527	0.86	62
Biochemical Oxygen Demand (BOD_5)	Influent	mg/L	NA [3]	NA	NA	NA	0
	Effluent	mg/L	45/30	<2.0	24	6.6	62
	NA	% removal	85 [4]	NA	NA	NA	0
	Effluent	lb/day	255	12.0	157.0	46.8	62
Total Suspended Solids (TSS)	Influent	mg/L	NA [3]	NA	NA	NA	0
	Effluent	mg/L	45/30	4	22	9.6	62
	NA	% removal	65 [4]	NA	NA	NA	0
	Effluent	lb/day	313	23.0	167.9	71	62
Fecal Coliform Bacteria (median value) [5]	Effluent	Number per 100 mL	NA [6]	6	3200	37	35
pH (median value)	Effluent	s.u.	6.0 to 9.0	6.05	7.66	6.85	62
Temperature	Effluent	ºC	NA [3]	NA	NA	NA	0
Total Residual Chlorine	Effluent	mg/L	NA [3]	NA	NA	NA	0
Total Ammonia as N, annual	Effluent	mg/L	NA [2]	0.13	32.9	15.8	62
Total Ammonia as N, winter [7]	Effluent	mg/L	NA [2]	0.81	32.9	22.3	27
Total Ammonia as N, summer [7]	Effluent	mg/L	NA [2]	0.13	21.4	10.8	35
Total Kjeldahl Nitrogen	Effluent	mg/L	NA [2]	1.24	36.1	17.9	62
Nitrate + Nitrite as N	Effluent	mg/L	NA [2]	<0.01	18.8	3.92	62
Total Nitrogen [8]	Effluent	mg/L	NA [2]	7.35	36.18	21.91	62
		lb/day	280	36	350	159	62
Total Phosphorus as P	Effluent	mg/L	1.0	0.13	0.82	0.41	62
		lb/day	10.4	0.70	7.9	3.05	62
Dissolved Oxygen	Effluent	mg/L	NA [3]	NA	NA	NA	0
Oil and Grease	Effluent	mg/L	NA [3]	NA	NA	NA	0
		lb/day	NA [3]	NA	NA	NA	0
Total Dissolved Solids	Effluent	mg/L	NA [3]	NA	NA	NA	0

Footnotes: NA means not available/not applicable
(1) Conventional and Non-conventional Pollutants only, table does not include information on toxic pollutants.
(2) No effluent limit in previous permit, monitoring requirement only.
(3) No limit or monitoring requirement in previous permit.
(4) Effluent limit in previous permit, no monitoring required.
(5) Sample period is April 1 through October 31.
(6) Monthly limits in effect, see previous permit.
(7) Summer period is April 1 through October 31; winter period is November 1 through March 31.
(8) Calculated as the sum of TKN and Nitrite + Nitrate as N concentrations.

C. Compliance History

Review of the DMRs showed 30-day TN load values higher than the permit load limitation of 280 lb/day four times in the POR. No other out-of-compliance conditions were noted for effluent water quality.

An Administrative Compliance Order, WQ-95-003 was issued on December 1, 1995, for the history of non-compliance with permit requirements, including repeated by-passing of the entire facility, by-passing of the phosphorus removal clarifier, failure to report by-passing of treatment, excessive sludge build up in treatment cells, and alterations to the facility without the proper notification or approval. The separation of storm water and wastewater in the collections system was to be part of the AOC action items as well as a facility plan to address excessive Inflow and Infiltration (I/I) due to storm events. There is no record of the City responding to the AOC in the MPDES administrative file.

14 SSO events documented since January 2004 have resulted in Administrative Order on Consent WQ-06-04. It was issued September 27, 2006 for the discharge of untreated sewage from a location other than as authorized, the failure to comply with all permit conditions, and the failure to at all times properly operate and maintain all facilities and systems of treatment and control Corrective actions include, but are not limited to: hiring additional personnel, design and implementation of an emergency response plan for trouble locations, installing a new telephone alarm dialer, acquiring additional equipment, increasing inspection frequencies, repairing or replacing deteriorated or failing equipment, developing a sewer overflow response plan.

III. Proposed Technology-based Effluent Limits (TBELs)

A. Applicability

The Board of Environmental Review has adopted by reference 40 CFR 133 which sets minimum treatment requirements for secondary treatment or equivalent for publicly owned treatment works (POTW) [ARM 17.30.1209]. National Secondary Standards (NSS) as described in 40 CFR 133, are incorporated into all municipal permits. Secondary treatment is defined in terms of effluent quality as measured by BOD_5, TSS, percent removal of BOD_5 and TSS, and pH.

The regulations in 40 CFR 133.105 allow for the application of treatment equivalent-to-secondary effluent limitations (TES) to facilities that meet specific criteria. To qualify for treatment equivalent-to-secondary (TES), the facility must use either a trickling filter or waste stabilization pond as the principle process of treatment as stated in 40 CFR 133.101(g)(2) and the treatment works must also provide significant biological treatment of the municipality's wastewater [40 CFR 133.101(g)(3)]. Significant biological treatment is defined as aerobic or anaerobic treatment that consistently achieves 65% removal of BOD_5 [40 CFR 133.101(k)]. The Whitefish WWTP is an aerated lagoon system and qualifies for consideration for TES.

As stated in 40 CFR 133.101(g)(1), facilities are further eligible for TES if the 95^{th} percentile of the 30-day average concentration in the discharge from the treatment works exceeds the minimum level

of effluent quality as set forth in 40 CFR 133.102(a)&(b) with proper operation and maintenance. Analysis of the POR DMR data shows:

- the 95th percentile for 30-day BOD_5 is 14 mg/L
- the 95th percentile for 30-day TSS is 16 mg/L

In past permit cycles, the Whitefish WWTP has had BOD_5 concentration limitations reflective of NSS. These BOD_5 limits will remain in effect for this permit cycle. Prior to this permit cycle, the permittee was not required to monitor the BOD_5 percent removal criterion. BOD_5 percent removal requirements based on NSS (85%) and monitoring will be implemented with this permit renewal [40 CFR 136.102(a)(1)].

The previous permit applied the NSS limitations for TSS with the exception of the percent removal requirement which remained at the TES 65 percent value. The effluent quality for TSS at the Whitefish plant, as noted above, is well within the NSS limitations. Prior to this permit cycle, the permittee was not required to monitor the percent removal criterion for TSS. TSS percent removal requirements based on NSS (85%) and monitoring will be implemented with this permit renewal according to 40 CFR 133.105(b).

B. Mass-based Limitations

ARM 17.30.1345(8) requires that all effluent limits be expressed in terms of mass. The following equation was used to calculate the BOD_5 and TSS load limitations using the design flow of 1.25 mgd and the TBELs limitations as proposed above:

Load (lb/day) = Design Flow x Concentration Limit (mg/L) x 8.34 (lb·L)/(mg·gal)

<u>TSS and BOD_5</u>
Load Limitations:
30-day average TSS and BOD_5 loads (lb/d) = (1.25 mgd)(30 mg/L)(8.34) = 313 lb/d
7-day average TSS and BOD_5 loads (lb/d) = (1.25 mgd)(45 mg/L)(8.34) = 469 lb/d

Loading limits for technology-based parameters of concern will apply to the effluent and will be maintained at the more stringent of the nondegradation load values, water-quality-based effluent limitations, and/or load limits calculated in this permit renewal.

C. Nondegradation Loads

The provisions of ARM 17.30.701 - 718 (Nondegradation of Water Quality) apply to new or increased sources of pollution [ARM 17.30.702(18)]. Sources that are in compliance with the conditions of their permit and do not exceed the limits established in the permit or determined from a permit previously issued by the Department are not considered new or increased sources.

Nondegradation load values for the Whitefish WWTP were calculated for BOD_5, TSS, total nitrogen (TN) and total phosphorus as P (TP) as part of the renewal of the permit in 1995. The nondegradation loads and the actual average loads discharged from the facility for the period of

record (POR) January 2002 through February 2007 are presented below. Actual loads for BOD_5, TSS, TN, and TP were obtained from the facility DMRs. These data indicate that the facility did not exceed the nondegradation load values calculated for TSS, TN and TP and is not considered to be a new or increased source.

Table 4. Nondegradation and Actual Loads for POR

Parameter	Units	Nondegradation Load Values and Permit Limits	Actual 30-Day Average Loads				
		Annual Average Load	2002	2003	2004	2005	2006
BOD_5	lb/day	255	71	34	38	39	49
TSS	lb/day	313	87	59	58	67	86
TN	lb/day	280	153	140	156	170	158
TP as P	lb/day	10.4	3.1	2.8	2.6	2.8	3.9

D Proposed TBELs

The annual average load limits expressed in terms of lb/day in the previous permit will be applied to the discharge with this permit renewal as the average monthly load limit (AML). In order to calculate the appropriate weekly load limit for BOD_5, the AML of 255 lb/day is multiplied by 1.5 [40 CFR 133.101(f)]. Hence, the BOD_5 weekly load limit will be 382 lb/day. The TSS limits are the mass-based expression of the proposed monthly and weekly concentration limits.

Table 5. Outfall 001 Proposed TBELs

Parameter	Concentration (mg/L)		Load (lb/day)	
	Average Monthly (1)	Average Weekly (1)	Average Monthly (1)	Average Weekly (1)
BOD_5	45	30	255	382
TSS	45	30	313	469
pH, s.u	Within the range of 6.0 to 9.0 (instantaneous)			
BOD_5 Percent Removal (1)	85 %			
TSS Percent Removal (1)	85 %			
1 .See Definition section at end of permit for explanation of terms				

IV. Water-Quality Based Effluent Limits (WQBELs)

A. Scope and Authority

The Montana Water Quality Act (Act) states that a permit may only be issued if the Department finds that the issuance or continuance of the permit will not result in pollution of any state waters [75-5-401(2), Montana Code Annotated (MCA)]. Montana water quality standards at ARM

17.30.637(2) require that no wastes may be discharged such that the waste either alone or in combination with other wastes will violate or can reasonably be expected to violate any standard. ARM 17.30.1344(1) adopts by reference 40 CFR 122.44 which states that MPDES permits shall include limits on all pollutants which will cause, or have a reasonable potential to cause an excursion of any water quality standard, including narrative standards. The purpose of this section is to provide a basis and rationale for establishing WWTP effluent limits, based on Montana water quality standards that will protect designated uses of the receiving stream.

The Act authorizes the issuance of point source discharge permits on a listed water body pending completion of a TMDL provided that: 1) the discharge is in compliance with the provisions of 75-5-303 (Nondegradation Policy), MCA; 2) the discharge will not cause a decline in water quality for the parameters for which the water body is listed; and, 3) the minimum treatment requirements under 75-5-703(10), MCA are met.

B. Receiving Water

The Whitefish WWTP discharges to the Whitefish River identified as USGS Hydrologic Unit Code (HUC) 17010210, Stillwater River, MT and Montana stream segment MT76P003-010. The Whitefish River is classified B-2 [ARM 17.30.608(1)(a)(iv)]. Class B-2 waters are to be maintained suitable for drinking, culinary and food processing purposes, after conventional treatment; bathing, swimming and recreation; growth and marginal propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply [ARM 17.30.624(1)]. Degradation that will impact established beneficial uses is not allowed.

The 1996 303(d) list sites the Whitefish River as partially supportive of aquatic life support, cold water fisheries-trout, drinking water supply, and primary recreation (swimming) in the area of the WWTP discharge. Probable causes of impairment include nutrients, pathogens, siltation, suspended solids and thermal modifications. The probable sources are listed as agriculture, municipal point sources, and natural sources.

The 2006 303(d) list includes the Whitefish River as partially supportive of aquatic life support and cold water fisheries-trout. The list cites the metals copper and lead, total nitrogen, oil and grease (O&G), PCBs in the water column, and water temperature as probable causes of impairment. The probable sources of this impairment include industrial point sources, wet weather discharges [point source and combination of stormwater, sanitary sewer overflows (SSO), or combined sewer overflows (CSO)], silviculture activities, and site clearance (land development or redevelopment).

The United States Geological Service (USGS) collects flow and other data for the Whitefish River at gauging station 12366000 below the WWTP. The seven-day, ten-year low flow condition for the receiving water, the 7Q10, at this station is reported to be 13 cfs or 8.4 mgd (US Geological Survey, *Statistical Summaries of Streamflow in Montana and Adjacent Areas,* Water Years 1900 through 2002, Scientific Investigations Report 2004-5266, 2004). The WWTP discharge average monthly-maximum discharge is 1.14 mgd. In order to obtain a 7Q10 value for the Whitefish River at the point of discharge, the 7Q10 value from the gauging station was corrected by subtracting the average monthly-maximum discharge flow rate (1.14 mgd) from the full 7Q10 value (8.4 mgd). For the purposes of this permit renewal, the corrected 7Q10 value for Whitefish River (7.26 mgd) will be

used for calculations. This results in a dilution ratio of 5.8 (7.26 mgd/1.25 mgd, the 7Q10 compared to the design flow of the facility).

The Montana Department of Fish, Wildlife, and Parks MFISH database describes the Whitefish River as an area of substantial fisheries resource value for both habitat and sports classifications (May 2007). Abundant fish species resident year-round include the largescale and longnose suckers. Species commonly present as year-round residents are the peamouth, and redside shiner. The mountain whitefish, northern pike, brook trout and rainbow trout are rare year-round residents. The slimy sculpin and bull trout are known to be present; the sculpin as a year-round resident and the bull trout as primarily migrating through this area.

Ambient water quality data for the Whitefish River in the 2.5 mile stretch between Whitefish Lake and the outfall location were compiled by PBS&J in support of the Whitefish River TMDL Planning Area, Watershed Characterization Report, November 2006 and from the permittee DMRs for the period of record 1992 to 2004. A summary of the data is presented in Table 6.

Table 6. Whitefish River - Ambient Water Quality Monitoring Data

Parameter	Units	Number of Samples	Long Term Average	Minimum Value	Maximum Value
pH, Annual, median value	s.u.	42	8.27	5.59	8.89
pH, Summer (1)	s.u.	25	8.32	5.59	8.89
pH, Winter (2)	s.u.	17	8.24	7.27	8.43
Temperature, Annual	°C	38	10.4	1.8	23.3
Temperature, Summer (1)	°C	24	14.2	5.8	23.3
Temperature, Winter (2)	°C	14	3.8	1.8	7.3
Total Ammonia as N, Annual	mg/L	30	0.05	<0.010	0.12
Total Ammonia as N, Summer (1)	mg/L	18	0.05	<0.010	0.11
Total Ammonia as N, Winter (2)	mg/L	12	0.04	<0.010	0.12
Total Nitrogen	mg/L	17	0.10	0.058	0.205
Total Phosphorus as P	mg/L	16	0.01	0.005	0.009

(1) Summer period is April 1 through October 31.
(2) Winter period is November 1 through March 31.

C. Applicable Water Quality Standards

Discharges to surface waters classified B-2 are subject to the specific water quality standards of ARM 17.30.624 (March 31, 2006), Department Circular DEQ-7 (February 2006), as well as the general provision of ARM 17.30.635 through 637, 641, 645, and 646. In addition to these standards, dischargers are also subject to ARM 17.30 Subchapter 5 (Mixing Zones, November 2004) and Subchapter 7 (Nondegradation of Water Quality, June 30, 2004).

In March of 2002, the EPA approved the Flathead Lake nutrients TMDL (EPA reference 8EPR-EP, March 2002). In summary, the TMDL identified nitrogen and phosphorus as the pollutants of concern for the waterbody. It set water quality goals/endpoints for Flathead Lake with an overall 25 percent reduction in long term nitrogen and phosphorus loads to Flathead Lake. These are presented in Attachment A.

The Review of Flathead Lake TMDL enclosure in the 2002-issued TMDL states in part on page 4 of 4 under section G. Allocation, "This TMDL addresses the need to achieve further reductions in nutrients to attain and maintain water quality goals in Flathead Lake. There is a desire to move forward with controls in the areas of the basin where there is confidence that nutrients need to be controlled (i.e., the developed urban and agricultural areas). The allocation to these areas (i.e., 25 % reduction in nutrient loads) is the first phase of a phased allocation approach. The second phase of allocation will come once there is a better understanding of how the remaining sources affect lake quality. Source (*sic*) under this category include municipal point source facilities, atmospheric deposition, septic tanks, and other non-point sources."

ARM 17.30.635(4) requires that the design condition for disposal systems must be based on the 7-day average flow of the receiving water which is expected to occur on average once in 10-years (7Q10). More restrictive requirements may be necessary due to specific mixing zone requirements.

D. Mixing Zone

A mixing zone is an area where the effluent mixes with the receiving water and certain water quality standards may be exceeded [ARM 17.30.502(6)]. The Department must determine the applicability of currently granted mixing zones [ARM 17.30.505(1)]. Mixing zones allowed under a permit issued prior to April 29, 1993 will remain in effect unless there is evidence that previously allowed mixing zones will impair existing or anticipated uses [ARM 17.30.505(1)(c)].

In accordance with ARM 17.30.517(1)(b), acute water quality standards for aquatic life may not be exceeded in any portion of the mixing zone unless the Department finds that allowing minimal initial dilution will not threaten or impair existing uses. The discharge must also comply with the general prohibitions of ARM 17.30.637(1) which require that state waters, including mixing zones, must be free from substances which will:

(b) settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines;
(c) create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 milligrams per liter) or globules of grease or other floating materials;
(d) produce odors, colors or other conditions as to which create a nuisance or render undesirable tastes to fish flesh or make fish inedible;
(e) create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life; and
(f) create conditions which produce undesirable aquatic life.

Although certain standards may be exceeded in the mixing zone, an effluent in its mixing zone may

not block passage of aquatic organisms nor may it cause acutely toxic conditions [ARM 17.30.602(16)]. No mixing zone will be granted that will impair beneficial uses [ARM 17.30.506(1)]. Aquatic life-chronic, aquatic life-acute and human health standards may not be exceeded outside of the mixing zone [ARM 17.30.507(1)(a)]. Acute standards may not be exceeded in any part of the mixing zone [ARM 17.30.507(1)(b)]. However, ARM 17.30.602(16) states that an effluent in its mixing zone, may not block passage of aquatic organisms nor may it cause acutely toxic conditions, except ammonia, chlorine, and dissolved oxygen may be present at concentrations so as to cause potentially toxic conditions in no more than 10% of the mixing zone provided that there is no lethality to aquatic organisms passing through the mixing zone.

A standard mixing zone may be granted for facilities which discharge less than 1 million gallons per day (MGD) or when mixing is nearly instantaneous [ARM 17.30.516(3)(d)]. Nearly instantaneous mixing is assumed if the discharge is through an effluent diffuser, when the mean daily flow exceeds the 7-day, 10-year low flow (dilution ratio <1) or the permittee demonstrates through a Department approved study plan that the discharge is nearly instantaneous. A nearly instantaneous mixing zone may not extend downstream more than two (2) river widths.

Effluent discharges which do not qualify for a standard mixing zone mixing zone must apply for a source specific mixing zone in accordance with ARM 17.30.518 and must conform to the requirements of 75-5-301(4), MCA which states that mixing zones must be the smallest practicable size; have minimal effects on uses; and, have definable boundaries. ARM 17.30.515(2) states that a person applying for a mixing zone must indicate the type of mixing zone and provide sufficient detail for the Department to make a determination regarding the authorization of the mixing zone under the rules of Subchapter 5.

The Whitefish WWTP design discharge flow is greater than 1.0 mgd (1.25 mgd). The dilution ratio is less than 100:1 (5.8). However, the effluent pipe is equipped with a diffuser. Therefore, the discharge qualifies for an instantaneous standard mixing zone of no greater than two stream-widths and the Department will use the full 7Q10 dilution flow of 7.26 mgd to develop chronic effluent limitations where applicable [ARM 17.30.516(3)(a)].

The 1996-defined mixing zone extended downstream for 200 feet from the outfall location. This was based on Best Professional Judgment. The mixing zone was defined as nearly instantaneous due to the presence of an effluent diffuser on Outfall 001. The effluent pipe is equipped with a ductile iron, multi-port diffuser (15 ports on alternate sides with one foot centers) that extends 18 feet across the river bed.

ARM 17.30.516(3)(d) states that a nearly instantaneous mixing zone may not extend downstream more than two (2) river widths. River width at 7Q10 is estimated to be approximately 50 feet from review of aerial photographs available on the Montana Natural Resources Information System Topofinder II digital mapping website (June 2007). Therefore the length of the chronic mixing zone will be reduced to 100 feet downstream from the point of discharge.

Because of the presence of the diffuser on the outfall, nearly instantaneous mixing is assumed for the acute condition. When a diffuser is in place, an acute standard may be exceeded at the end of the pipe but no acute lethality in the mixing zone is anticipated due to the degree of mixing provided by

the diffuser. Since 1996, the facility has passed Whole Effluent Toxicity (WET) tests conducted on a quarterly basis throughout the last 10 years (DMR review).

E. Basis and Proposed Water Quality-Based Effluent Limits

Parameters typically present in municipal wastewater that may cause or contribute to a violation of water quality standards include the conventional pollutants such as biological material (as measured by BOD_5), suspended solids, oil & grease, pathogenic bacteria, and pH; the non-conventional pollutants such as total residual chlorine, total ammonia, total nitrogen, and total phosphorus; and the carcinogenic and toxic pollutants such as volatile organic carbon substances and metals which can include, but is not limited to, arsenic, cadmium, chromium, copper, cyanide, lead, mercury, molybdenum, nickel, selenium, silver, and zinc.

ARM 17.30.1345 requires WQBELs to be developed for any pollutant for which there is reasonable potential (RP) for discharges to cause or contribute to exceedences of instream numeric or narrative water quality standards. RP calculations utilize the receiving water concentration, the maximum projected effluent concentration, the design flow of the wastewater treatment facility, and the applicable receiving water flow.

The Department uses a mass balance equation to determine RP (*Equation 1*).

$$C_{RP} = \frac{C_E Q_E + C_S Q_S}{Q_E + Q_S} \qquad \textit{(Eq. 1)}$$

Where:

C_{RP} = receiving water concentration (RWC) after mixing, mg/L
C_E = maximum projected effluent concentration, mg/L
C_S = RWC upstream of discharge, mg/L
Q_S = applicable receiving water flow, mgd
Q_E = facility design flow rate, mgd

1. Conventional Pollutants

Total Suspended Solids (TSS) and Biological Oxygen Demand (BOD_5) - The facility provides a significant reduction in biological material and solids through secondary treatment (Section III). The application of the percent removal criteria for BOD_5 and TSS will increase water protection (Section III.). No additional WQBELs will be required for these parameters.

pH - Pursuant to ARM17.30.624(2)(c), the induced variation of hydrogen ion concentration within the range of 6.5 to 8.5 must be less than 0.5 pH units. Natural pH outside this range must be maintained without change. Natural pH above 7.0 must be maintained above 7.0.

Oil and Grease (O&G) – The previous permit did not limit O&G in the effluent. No monitoring for this parameter has been performed. The Whitefish River is cited on the 2006 303(d) list as impaired for O&G due to industrial point sources. As retention times can also be short in this system (<20

days), the maximum daily limit of 10 mg/L (ARM 17.30. 637(1)(b) will be applied to the effluent and monthly monitoring for O&G will be conducted.

***Escherichia coli (E. coli)* Bacteria -** The permit will incorporate the change in the Montana state standards, which replaced fecal coliform bacteria with *Escherichia coli* (*E. coli*) bacteria, effective February 1, 2006. The applicable standards for *E. coli* are:

a. April 1 through October 31, of each year, the geometric mean number of the microbial species *E. coli* must not exceed 126 colony forming units (cfu) per 100 milliliters (mL), nor are 10% of the total samples during any 30-day period to exceed 252 cfu per 100 mL (ARM 17.30.623(2)(a)(i)); and
b. November 1 through March 31, of each year, the geometric mean number of *E. coli* shall not exceed 630 cfu per 100 mL and 10% of the samples during any 30-day period may not exceed 1,260 cfu per 100 mL (ARM 17.30.623(2)(a)(ii)).

ARM 17.30.505(2) states that if the Department determines that a mixing zone may interfere with or threaten a beneficial use, discharge limitations will be modified and if necessary, require the applicable numeric water quality criteria to be met at the end of the discharge pipe. The Department is not granting a mixing zone for *E. coli* bacteria based on the following considerations: 1) the 1996 303(d) list cites pathogens as a probable cause of impairment for the receiving waters; 2) the potential for public recreation [ARM 17.30.506(2)(b), recreational area, means public beach or swimming area, and adjacent streams or lakes]; and, 3) ARM 17.30.637(1)(e) which requires that state waters must be free from substances that are harmful or toxic to humans.

The previous permit had monthly fecal coliform bacteria limits in effect April 1 through October 31. Since the fecal coliform standard has been changed to *E. coli* and the values of these indicator species are linearly equivalent [126 colony forming units (cfu) /100 mL *E. coli* bacteria = 200 fecal coliform bacteria cfu/100 mL] the original fecal coliform limits are expressed in terms of *E. coli* in Table 7. For this permit cycle, interim seasonal (April 1 through October 1) *E. coli* bacteria limits will be based on the median value of the previous permit's individual monthly fecal coliform bacteria limitations adjusted for *E coli* equivalence (Table 7). These limits will remain in effect through midnight, June 30, 2011. The *E. coli* bacteria standards stated above will be applied to the effluent as the final limitations and will go into effect July 1, 2011. They will remain in effect through the term of the permit. The facility should evaluate how it will comply with the final *E. coli* bacteria limits.

Table 7. Equivalent Monthly *E. coli* Bacteria Interim Limits

Month	Units	Bacteria Limitations			
		7-Day Geometric Mean		30-Day Geometric Mean	
		fecal coliform	*E. coli* equivalent	fecal coliform	*E. coli* equivalent
April	cfu/100 mL	17,200	10,836	8,600	5,418
May	cfu/100 mL	52,800	33,264	26,400	16,632
June	cfu/100 mL	57,400	36,162	28,700	18,081
July	cfu/100 mL	23,800	14,994	11,900	7,497
August	cfu/100 mL	9,800	6,174	4,900	3,087
September	cfu/100 mL	9,400	5,922	4,700	2,961
October	cfu/100 mL	6,800	4,284	3,400	2,142
Median Value	cfu/100 mL	-	10,836	-	5,418

2. Nonconventional Pollutants

Total Ammonia-Nitrogen - Total ammonia-nitrogen limits are developed based on standards that account for a combination of pH and temperature of the receiving stream, the presence or absence of salmonid species, and the presence or absence of fish in early life stages. Because pH and temperature can vary greatly on a seasonal basis, as can the presence or absence of fish in early life stages, DEQ Circular DEQ-7 (February 2006) allows for the determination of ammonia standards and the resulting limits on a seasonal basis. Salmonid fishes and their early life stages are presumed present year-round.

Table 8 presents the total ammonia-N water quality standards for the Whitefish River using the ambient Whitefish River water quality data in Table 6.

Table 8. Total Ammonia-N Water Quality Standards for Receiving Water.

Condition	Period (1)	Salmonids Present	Early Life Stages Present	Ambient Condition		Water Quality Standard (2)
				pH	Temperature °C	
Acute	Annual	Yes	NA	8.67 (3)	NA	1.56
Chronic	Summer	NA	Yes	8.45 (4)	18.6 (4)	0.91
Chronic	Winter	NA	Yes	8.34 (4)	5.0 (4)	1.43

Footnotes: NA – Not Applicable
(1) Winter period is taken to be November 1 through March 31; summer period is taken to be April 1 through October 31.
(2) Acute - maximum daily; Chronic - 30-day average concentration.
(3) Based on 95th percentile of annual data.
(4) Based on 75th percentile of values in the applicable period.

The maximum reported total ammonia as nitrogen value, 32.9 mg/L, exceeds the calculated state

acute standard of 1.56 mg/L. However, due to the presence of a diffuser on the outfall no acute lethality is anticipated in the mixing zone and the full 7Q10 flow will be used to calculate limits.

Reasonable potential (RP) to exceed the water quality standard for total ammonia-N was assessed using *Equation 1*, where:

C_{RP} = receiving water concentration (RWC) after mixing, mg/L
C_E = maximum projected effluent concentration, 32.9 mg/L
C_S = RWC upstream of discharge, 0.05 mg/L
Q_S = applicable receiving water flow, the 7Q10, 7.26 mgd
Q_E = facility design flow rate, 1.25 mgd

$$C_{RP} = \frac{(1.25*32.9) + (7.26*0.05)}{(1.25 + 7.26)} = 4.87 \text{ mg/L}$$

This value is greater than any of the calculated summer or winter chronic total ammonia-N standards and the acute standard, therefore, RP exists for this parameter and limits are necessary. The winter and summer season chronic Waste Load Allocations (WLA) and end of pipe limits are calculated and presented in Attachment B. For the winter season (November 1 through March 31), the discharge average monthly limit (AML) for total ammonia-N is calculated to be 7.2 mg/L and the maximum daily limit (MDL) is 10.2 mg/L. The summer season (April 1 through October 31) AML is 5.9 mg/L with an MDL of 8.3 mg/L.

These total ammonia-N limits will not be included in this permit because the current WWTP is not capable of removing ammonia to these levels and the process for upgrading the facility is outside the scope of this five (5) year permit cycle. The permit will include a compliance schedule requiring the permittee to evaluate upgrades to achieve compliance with the proposed ammonia limits by December 31, 2014. The proposed total ammonia-N effluent limits will remain in this Fact Sheet and provide a basis for ammonia limits during the next permit cycle.

Nutrients [Total Nitrogen (TN) and Total Phosphorus as P (TP)]: The state of Montana has narrative water quality standards that apply to nutrients in the Whitefish River. The Department interprets the General Prohibition of ARM 17.30.637(1)(e) to apply to state waters when nutrient levels contribute to excessive algal biomass and causes adverse effects on other beneficial uses. ARM 17.30.637 requires that "state surface waters must be free from substances attributable to municipal discharges that will…create conditions which produce undesirable aquatic life".

Nutrients, when present in excessive amounts, can contribute to interferences with the beneficial uses of surface waters. Measurable affects of increased and excessive nutrient levels are elevated algae biomass [as measured by the presence of chlorophyll *a* (Chl *a*)] and the dominance of aquatic life communities by pollutant-tolerant species. Algae overgrowth can be esthetically displeasing, contribute to taste and odor problems, impede flow, and create harmful conditions for aquatic life.

Currently, there are no numeric water quality standards for nutrients that apply to the Whitefish River in the area of the WWTP discharge. The Whitefish River is cited on the 1996 303(d) list as

impaired due to nutrients. The 2006 303(d) list cites nitrogen as the nutrient of concern for impairment.

The 1996-developed permit limited TP in the effluent to 1.0 mg/L. This TP limit will be continued with this permit cycle. However, in the absence of an approved TMDL, it is necessary to consider development of a limit for TN to address the impairment listing. The TMDL for the Whitefish River is slated for development in the 2007-2009 timeframe.

The greater Whitefish area is experiencing development pressures and this will likely require increasing the capacity of the existing collections system and treatment facilities (Whitefish Wastewater System Utility Plan, 2006). The US Census Bureau's 2006 population estimate for Whitefish is 7,723 people. In 2000, the population was 5,032. The Utility Manager indicated that new subdivisions are being hooked up to the system on a regular basis. These increases of service area for the WWTP will result in an additional load of nutrients to the receiving waters. The Whitefish Wastewater System Utility Plan (2006) projects the increases in load for TN through 2025. In 2005, influent TN load was stated to be 208 lb/day. In 2015 this value increases to 364 lb/day and in 2025 it reaches 550 lb/day.

In order to comply with 75-5-730(10), MCA and the September 21, 2000 Federal District Court Ruling (Molloy Decision, see Part IX of this Fact Sheet), and ultimately to protect both the receiving waters (the Whitefish River) and downstream waters (the Stillwater and Flathead Rivers and, Flathead Lake), the Department is proposing TN limits for this permit cycle.

The nutrient limits are based on the current performance of the POTW, using existing TN loads as obtained from the Discharge Monitoring Reports (DMRs) for Outfall 001 for the period of record January 2002 through February 2007. Calculations are presented in Attachment C.

The Maximum Daily Limit (MDL) and Average Monthly Limit (AML) were developed using the long term average of the data set and the long term average multipliers for the 99th percentile based on the statistics of the data set (Technical Support Document, EPA/505/2-90-001, March 1991). These limits take into account the variability of the effluent quality and will apply to the effluent prior to mixing with the receiving water at Outfall 001 (no mixing zone). The formulae used are as follows:

MDL = LTA $e^{[2.326S - 0.5(S*S)]}$, use EPA TSD, Table 5-2 for 99th percentile,
AML = LTA $e^{[2.326S - 0.5(S*S)]}$, use EPA TSD, Table 5-2 for 99th percentile, n = 4

Until the development of a TMDL, the effluent TN and TP load limits will serve as an interim wasteload allocation for the POTW. Additional reductions in nutrients may be necessary in the future as part of a basin-wide TMDL.

The TP annual average load limit expressed in terms of lb/day in the previous permit will be applied to the discharge with this permit renewal as the average monthly load limit (AML).

Table 9. Outfall 001 proposed TN and TP Load Limitations

Parameter	Load (lb/day)	
	Average Monthly Limit (1)	Maximum Daily Limit (1)
Total Nitrogen (2)	273.2	425.8
Total Phosphorus as P	10.4	-

Footnotes: NA = Not Applicable
(1) See Definition section at end of permit for explanation of terms.
(2) Calculated as the sum of Nitrate + Nitrite as N and Total Kjeldahl Nitrogen (TKN) concentrations.

Dissolved Oxygen (DO) –Freshwater aquatic life standards are characterized by the fishery (cold- or warm-water) and by the presence or absence of fish in early life stages (DEQ Circular DEQ7, February 2006). They are presented in Table 10, below. Standards are further defined based on a specific period of time and required in-stream DO levels. Classification states this waterbody is a cold-water fishery (trout) and all life stages are assumed to be present as discussed above. Dissolved oxygen is a typical pollutant of concern for Publicly Owned Treatment Works (POTW). The WWTP is a major aerated lagoon facility with increasing discharge flows. DO has not been monitored at this facility in previous permit cycles and is not routinely monitored as part of the facility process control. No limit for DO is proposed; however, the permittee will be required to monitor DO levels in the effluent during this permit cycle. Due to the short retention time of the facility, monthly monitoring of the effluent for DO will be included in this permit cycle.

Table 10. Dissolved Oxygen (DO) Standards For Waters Classified B-2 (DEQ Circular-7, February 2006).

Condition	30-Day Mean (mg/L)	7-Day Mean (mg/L)	7-Day Mean Minimum DO (1) (mg/L)	1-Day Minimum DO (1) (mg/L)
Early Life Stages (2,3)	NA	9.5 (6.5)	NA	8.0 (5.0)
Other Life Stages	6.5	NA	5.0	4.0

Footnotes:
(1) All minima should be considered as instantaneous concentrations to be achieved at all times. These are water column concentrations recommended to achieve the required inter-gravel DO concentrations shown in parentheses.
(2) For species that have early life stages exposed directly to the water column, the figures in parentheses apply.
(3) Includes all embryonic and larval stages and all juvenile forms of fish to 30-days following hatching.

Total Residual Chlorine (TRC) - The facility does not have disinfection capabilities at this time. However, in the event chlorination is utilized as a method of disinfection to meet permit bacteriological limitations, an effluent WQBEL of 0.011 mg/L chronic limitation (average monthly limit, AML) and an acute limitation of 0.019 mg/L (maximum daily limit, MDL) shall be applied to the discharge at the end of pipe in accordance with Circular DEQ-7 (February 2006) due to the presence of aquatic organisms' early life stages in the receiving water year-round.

3. Toxic Pollutants

ARM 17.30.623(2)(h) states that concentrations of carcinogenic, bio-concentrating, toxic, or harmful parameters which would remain in the water after conventional treatment may not exceed the applicable standards specified in Department Circular DEQ-7 (February 2006).

Total Recoverable Metals - The Whitefish River in the area of discharge is on the 2006 303(d) list for metals, specifically, lead, and copper due to industrial point sources. The WWTP also utilizes alum in the phosphorus removal clarifier. Dissolved aluminum concentrations in the effluent may be of concern in regards to compliance with the dissolved aluminum water quality standards in DEQ-7 (February 2006). The acute aquatic life standard is 0.75 mg/L and the chronic standard is 0.87 mg/L.

Monitoring for metals in the effluent has not been performed previously at this facility. There is a lack of information available to perform an RP assessment. Therefore, monitoring for these parameters (specifically dissolved aluminum, total recoverable copper and lead) will be included in this permit.

Organic Substances - The Whitefish River in the area of discharge is on the 2006 303(d) list for PCBs in the water column due to industrial point sources. Monitoring for organic substances in the effluent has not been performed previously at this facility. There is a lack of information available to perform an RP assessment. Therefore, monitoring for these parameters will be expected with the next permit renewal application. A requirement to perform WET testing will also monitor potential toxicity in the effluent.

Whole Effluent Toxicity (WET) Testing – The previous permit includes the narrative limitation that the effluent shall be free of any acute toxicity. ARM 17.30.637(1)(d) requires that state waters be free from substances attributable to municipal waste that create conditions which are harmful or toxic to human, animal, plant or aquatic life; except the Department may allow limited toxicity in a mixing zone provided that there is no acuter lethality to organisms. The Whitefish WWTP has conducted WET testing on alternating species during the previous permit cycles. They have passed all WET tests in the POR.

In a WET test, acute toxicity occurs when 50 percent or more mortality is observed for a test species at any effluent concentration. Acute toxicity tests shall be conducted in accordance with the requirements of Part I. C. of the permit. Two animal species must be used each quarter. If no acute toxicity is observed for four consecutive calendar quarters, WET testing may be reduced to alternating one species each quarter. This change in monitoring requirements must be requested in writing and approved by the Department. Standard WET testing language will be included in the permit.

It is recognized that total ammonia-N concentrations may exceed the acute standard for the receiving water at the end of pipe (see Sections D. and E.2, above). The presence of a diffuser on the effluent pipe maximizes mixing (nearly instantaneous) and restricts acute toxicity in the receiving water. If WET testing and subsequent Toxics Identification/Reduction Evaluations (TIE/TRE) identify ammonia as the toxicant of concern, the permittee is not in violation of the prohibition of acute

toxicity in the effluent but will be expected to investigate and evaluate options to address toxicity in the effluent due to ammonia.

IV. Proposed Interim and Final Effluent Limitations

Outfall 001

Interim Limitations

The following final effluent limitations will be applied to the discharge at Outfall 001, upon the effective date of the permit and remain in effect until midnight, June 30, 2011.

Parameter	Units	Average Monthly Limit (1)	Average Weekly Limit (1)	Maximum Daily Limit (1)
BOD_5	mg/L	30	45	NA
	lb/day	255	382	NA
TSS	mg/L	30	45	NA
	lb/day	313	469	NA
E. coli Bacteria	cfu/100 mL (geometric mean)	5,418	NA	10,836
Total Phosphorus as P	mg/L	1.0	NA	NA
	lb/day	10.4	NA	NA
Total Residual Chlorine	mg/L	0.011	NA	0.019
Oil and Grease	mg/L	NA	NA	10

Footnotes: NA means not applicable.
(1) See Definition section at end of permit for explanation of terms.

There shall be no acute toxicity in the effluent.

pH: Effluent pH from Outfall 001 shall remain between 6.0 and 9.0 standard units (instantaneous minimum and instantaneous maximum) unless a variation is due to natural biological processes. For compliance purposes, any single analysis or measurement beyond this limitation shall be considered a violation of the conditions of this permit.

85 Percent (%) Removal Requirement for BOD_5: The arithmetic mean of the BOD_5 for effluent samples collected in a period of 30 consecutive days shall not exceed 15% of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (85% removal). This is in addition to the concentration limitations on BOD_5.

65 Percent (%) Removal Requirement for TSS: The arithmetic mean of the TSS for effluent samples collected in a period of 30 consecutive days shall not exceed 35% of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (85% removal). This is in addition to the concentration limitations on TSS.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Final Limitations

The following final effluent limitations will be applied to the discharge at Outfall 001, effective July 1, 2011 and remain in effect for the duration of the permit cycle.

Parameter	Units	Average Monthly Limit (1)	Average Weekly Limit (1)	Maximum Daily Limit (1)
BOD_5	mg/L	30	45	NA
	lb/day	255	382	NA
TSS	mg/L	30	45	NA
	lb/day	313	469	NA
E. coli Bacteria, winter (2, 3)	cfu/100 mL	630	NA	1260
E. coli Bacteria, summer (2, 3)	cfu/100 mL	126	NA	252
Total Phosphorus as P	mg/L	1.0	NA	NA
	lb/day	10.4	NA	NA
Total Nitrogen (4)	lb/day	273	NA	426
Total Residual Chlorine	mg/L	0.011	NA	0.019
Oil and Grease	mg/L	NA	NA	10

Footnotes: NA means not applicable.
(1) See Definition section at end of permit for explanation of terms.
(2) Winter is November 1 through March 31; summer is April 1 through October 31.
(3) Report geometric mean if more than one sample is collected during the reporting period.
(4) Calculated as the sum of Nitrate + Nitrite as N and Total Kjeldahl Nitrogen concentrations.

There shall be no acute toxicity in the effluent.

pH: Effluent pH from Outfall 001 shall remain between 6.0 and 9.0 standard units (instantaneous minimum and instantaneous maximum) unless a variation is due to natural biological processes. For compliance purposes, any single analysis or measurement beyond this limitation shall be considered a violation of the conditions of this permit.

85 Percent (%) Removal Requirement for BOD_5: The arithmetic mean of the BOD_5 for effluent samples collected in a period of 30 consecutive days shall not exceed 15% of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (85% removal). This is in addition to the concentration limitations on BOD_5.

85 Percent (%) Removal Requirement for TSS: The arithmetic mean of the TSS for effluent samples collected in a period of 30 consecutive days shall not exceed 15% of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (85% removal). This is in addition to the concentration limitations on TSS.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

V. Self-Monitoring Requirements

Review of the influent data supplied by the permittee shows wide variability in the nature of the influent water quality. BOD_5 concentrations fluctuate from as low as 34 mg/L to a high of 368 mg/L. TSS results show a similar trend with a low value of 20 mg/L and 930 mg/L as the high concentration.

DMR effluent 30-day average flow values exceeded design flow at least five times in the past two years. Prior to that, no exceedences of design flow had been reported during the POR. Operations personnel have noted that influent flows can be more than four times the average design flow during storm events (DEQ inspection, 2006). In June 2005, plant personnel diverted approximately six million gallons of effluent from the end of cell #3 to the surge basin in less than a two-day period due to rain that caused lift stations to fail, overwhelmed the collections system, and caused numerous SSOs (DEQ inspection, 2006).

The facility has a design retention time of 27.2 days. The most recent Whitefish Wastewater System Utility Plan (Anderson/Montgomery and HDR, May 2006) states that average daily flows from 2000 to 2005 were 0.750 mgd. The report states that peak hydraulic loading over the same time period averaged 2.2 mgd and that the facility experiences sustained high flows for several months annually. At 2.2 mgd the retention time drops to approximately 13 days; less than the specified 20 days' minimum retention time in DEQ Circular-2. The utility plan cites "Infiltration and inflow (I/I) associated with snowmelt, sump pumps, precipitation events, and high groundwater identified as the primary cause of the sustained flows."

In 1995, the permittee was under Department Administrative Compliance Order (Docket WQ-95-003) due to non-compliance with permit requirements, including repeated by-passing of the entire facility, by-passing of the phosphorus removal clarifier, failure to report by-passing of treatment, excessive sludge build up in treatment cells, and alterations to the facility without the proper notification or approval. The separation of storm water and wastewater in the collections system was to be part of the AOC action items as well as a facility plan to address excessive Inflow and Infiltration (I/I) due to storm events.

Fourteen (14) SSO events documented since January 2004 have resulted in Administrative Order on Consent WQ-06-04. It was issued September 27, 2006 for the discharge of untreated sewage from a location other than as authorized, the failure to comply with all permit conditions, and the failure to at all times properly operate and maintain all facilities and systems of treatment and control.

Because of the degree of I/I, the compliance history regarding the facilities, the variability of influent water quality, and the exceedences of the WWTP design flow the permittee will be required to monitor the influent and effluent flow continuously and water quality three (3) days per week using a flow-paced composite sample (when applicable to a parameter) in accordance with the schedule below.

All analytical procedures must comply with the specifications of 40 CFR Part 136. Samples shall be collected, preserved and analyzed in accordance with approved procedures listed in 40 CFR 136. Starting with the effective date of the permit and lasting for the duration of the permit cycle, self-

monitoring of effluent discharged at Outfall 001 shall be conducted at the discharge structure and samples will reflect the nature and effect of the discharge.

Outfall 001 Monitoring Requirements				
Parameter	Unit	Sample Location	Sample Frequency	Sample Type (1)
Flow	mgd	Influent	Continuous	(2)
	mgd	Effluent	Continuous	(2)
5-Day Biological Oxygen Demand (BOD_5)	mg/L	Influent (3)	3/Week	Composite
	mg/L	Effluent	3/Week	Composite
	% Removal (4)	Effluent	1/Month	Calculated
	lb/day	Effluent	1/Month	Calculated
Total Suspended Solids (TSS)	mg/L	Influent (3)	3/Week	Composite
	mg/L	Effluent	3/Week	Composite
	% Removal (4)	Effluent	1/Month	Calculated
	lb/day	Effluent	1/Month	Calculated
pH	s.u.	Effluent	3/Week	Instantaneous
Temperature	°C	Effluent	3/Week	Instantaneous
E. coli Bacteria	cfu/100 mL	Effluent	3/Week	Grab
Total Residual Chlorine (5)	mg/L	Effluent	Daily	Grab
Total Ammonia as N	mg/L	Effluent	1/Week	Composite
Nitrate + Nitrite as N	mg/L	Effluent	1/Week	Composite
Total Kjeldahl Nitrogen	mg/L	Effluent	1/Week	Composite
Total Nitrogen as N (6)	mg/L	Effluent	1/Week	Calculated
	lb/day	Effluent	1/Month	Calculated
Total Phosphorus as P	mg/L	Effluent	1/Week	Composite
	lb/day	Effluent	1/Month	Calculated
Dissolved Oxygen	mg/L	Effluent	1/Month	Grab
Oil & Grease (7)	mg/L	Effluent	1/Month	Grab
Dissolved Aluminum	µg/L	Effluent	1/Month	Composite
Total Dissolved Solids (TDS)	mg/L	Effluent	1/Quarter	Grab
Whole Effluent Toxicity, Acute	% Effluent	Effluent	1/Quarter	Composite

Footnotes:
(1) See Definitions section at end of permit for explanation of terms.
(2) Requires recording device or totalizer; permittee shall report daily maximum and daily average flow on DMR.
(3) Influent BOD_5 and TSS samples shall be collected even if no effluent discharge occurs in the monitoring period.
(4) Percent (%) Removal shall be calculated using the monthly average values
(5) The permittee is only required to sample for total residual chlorine if chlorine is used as a disinfectant in the treatment process. If chlorine is *not* used, write "NA" on the DMR for this parameter.
(6) Calculated as the sum of Nitrate + Nitrite as N and Total Kjeldahl Nitrogen concentrations.
(7) Use EPA Method 1664, Revision A: N-Hexane Extractable Material (HEM), or equivalent.

Outfall 001 Additional Monitoring Requirements				
Parameter	Unit	Sample Frequency	Sample Type (1)	ML
Copper, Total Recoverable (2)	µg/L	Semi-Annual	Composite	1
Lead, Total Recoverable (2)	µg/L	Semi-Annual	Composite	0.1

Footnotes:
1. See Definition section at end of permit for explanation of terms.
2. Metals shall be analyzed as total recoverable, use EPA Method (Section) 4.1.4 [EPA 600/4-79-020, March 1983] or equivalent.

Sludge Requirements

The permittee shall obtain authorization under EPA Region VIII Permit Number MTG650000, General Permit for Facilities/Operations that Generate, Treat, and/or Use/Dispose of Sewage Sludge by Means of Land Application, Landfill, and Surface Disposal Under the National Pollutant Discharge Elimination System. The permittee shall not dispose of sewage sludge such that any portion thereof enters any state water, including ground water. The permittee shall notify the Department in writing 45 days prior to any change in sludge management at the facility.

VII. Nonsignificance Determination

The proposed effluent limits and discharge flows for the Whitefish WWTP do not constitute a new or increased source of pollutants pursuant to ARM 17.30.702(16). Therefore, a nonsignificance analysis is not required [ARM 17.30.705(1)].

VIII. Special Conditions/Compliance Schedule

Total Ammonia - Nitrogen Effluent Limitations

The current facility cannot achieve the calculated total ammonia-N limits; these limits will not be included in this permit. The permittee must evaluate technologies and options to achieve compliance with the total ammonia-N limits by December 31, 2014.

1. Authority: 75-5-402(3), MCA and ARM 17.30.1345(1)

   This statute and rule state that effluent limitations must be established for each outfall and that those limitations must be clearly specified in the permit. Total ammonia-N limits calculated in this Fact Sheet will not be included in this permit because the Whitefish WWTP is not capable of removing ammonia to these levels and the process for upgrading the facility is outside the scope of this five (5) year permit cycle. The proposed ammonia effluent limits will remain in this Fact Sheet and provide a basis for ammonia limits during the next permit cycle.

With submittal of the application for renewal of permit in 2012 or sooner, the permittee will be required to submit plans and schedules for the planning, design, funding, and construction of upgrades required to meet the proposed limitations by December 31, 2014.

IX. Other Information

On September 21, 2000, a US District Judge issued an order stating that until all necessary total maximum daily loads (TMDLs) under Section 303(d) of the Clean Water Act are established for a particular water quality limited segment, the State is not to issue any new permits or increase permitted discharges under the MPDES program. The order was issued under the lawsuit Friends of the Wild Swan vs. US EPA et al, CV 97-35-M-DWM, District of Montana, Missoula Division.

The renewal of this permit does not conflict with Judge Molloy's order because the permit includes effluent limits that prohibit any increases above previously-allowed authorized amounts.

IX. Information Sources

1. Administrative Rules of Montana Title 17 Chapter 30 - Water Quality
   a. Sub-Chapter 2 - Water Quality Permit and Application Fees, November 2003.
   b. Sub-Chapter 5 - Mixing Zones in Surface and Ground Water, November 2004.
   c. Sub-Chapter 6 - Montana Surface Water Quality Standards and Procedures, September 2004.
   d. Sub-Chapter 7- Nondegradation of Water Quality, November 2004.
   e. Sub-Chapter 10 - Montana Ground Water Pollution Control System, September 2004.
   f. Sub-Chapter 11 - Storm Water Discharges,
   g. Sub-Chapter 12 - Montana Pollutant Discharge Elimination System (MPDES) Standards, March 2003.
   h. Sub-Chapter 13 - Montana Pollutant Discharge Elimination System (MPDES) Permits, March 2003.

2. City of Whitefish Wastewater Treatment Facility Plans Design Criteria Operations and Maintenance (O&M) Manual, Morrison-Maierle, Inc.1979.

3. City of Whitefish Phosphorus Removal Clarifier Design Criteria O&M Manual Carver Engineering, 1987.

4. City of Whitefish Facilities Upgrades Design Criteria O&M Manual Anderson/Montgomery 2003.

5. Federal Water Pollution Control Act (Clean Water Act), 33 U.S.C. §§ 1251-1387, October 18, 1972, as amended 1973-1983, 1987, 1988, 1990-1992, 1994, 1995 and 1996.

6. Federal Water Pollution Control Act (Clean Water Act), § 303(d), 33 USC 1313(d) Montana List of Waterbodies in Need of Total Maximum Daily Load Development, 1996 and 2006.

7. Montana Code Annotated Title 75 - Environmental Protection Chapter 5 - Water Quality,

October 2002.

8. Montana Department of Environmental Quality Administrative Compliance Order for Whitefish Wastewater Treatment Facility, Docket No. WQ-95-003, December 1, 1995.

9. Montana Department of Environmental Quality Circular DEQ-2, Design Standards for Wastewater Facilities, September 1999.

10. Montana Department of Environmental Quality letter to City of Whitefish regarding Montana WPCSRF Loan Project C301192-01 Whitefish, MT, June 25, 2002.

11. Montana Department of Environmental Quality Circular DEQ-7, Montana Numeric Water Quality Standards, February 2006.

12. Montana Department of Environmental Quality Notice of Violation and Administrative Order on Consent Docket No. WQ-06-04, September 27, 2006.

13. Montana Department of Environmental Quality Watershed Characterization Report, Whitefish TMDL Planning Area, PBS&J, November 2006.

14. Montana Department of Fish Wildlife and Parks D. Skaar, Spawning Times of Montana Fishes, March 2001.

15. Montana Pollutant Discharge Elimination System (MPDES) Permit Number MT0020184:
    a. Administrative Record, archived.
    b. Renewal Application DEQ Form 1 and EPA Form 2A, March 2006.
    c. Compliance Evaluation Inspection Report July, 2007.

16. US Code of Federal Regulations, 40 CFR Parts 122-125, 130-133, & 136.

17. US Code of Federal Regulations, 40 CFR Part 403 – General Pretreatment Regulations for Existing and New Sources of Pollution.

18. US Code of Federal Regulations, 40 CFR Part 503 – Standards for the Use or Disposal of Sewage Sludge.

19. US Department of the Interior US Geological Survey, Statistical Summaries of Streamflow in Montana and Adjacent Areas, Water Years 1900 through 2002, Scientific Investigations Report 2004-5266, 2004.

20. US EPA Technical Support Document for Water Quality-Based Toxics Control, EPA/505/2-30-001, March 1991.

21. US EPA NPDES Permit Writers' Manual, EPA 833-B-96-003, December 1996.

22. US EPA Region VIII NPDES Whole Effluent Toxics Control Program, August 1997.

23. US EPA Ref. 8EPR-EP, Flathead Lake (nutrients) Total Maximum Daily Load, March 2002.

24. US EPA NPDES Permit Writers' Course Manual, EPA-833-B-91-001, April 2003.

25. Whitefish 2006 Wastewater System Utility Plan, Anderson/Montgomery and HDR, May 2006

Completed July 25, 2007, MK Valett

Attachment A.

Waterbody Name*	**TMDL Parameter / Pollutant**	**Water Quality Goal/Endpoint**	**TMDL**	**TMDL Section Type**	**Supporting Documentation** (partial list)
Flathead Lake * USGS HUC *17010208* Segments: *MT76LJ006-1* (ID # 1996 List) *MT76O003-010* (ID # 2000 List)	Nitrogen Phosphorus	• 80 g Carbon/m^2/yr • No declining trend in hypolimnionic dissolved oxygen • No measurable blooms of *Anabaena* or other pollution algae • 1.0 µg/L of chlorophyll *a* • Maintaining or decreasing near-shore algal growth on rocks • 5.0 µg/L total phosphorus • <0.5 Mg/L soluble reactive phosphorus • 95 µg/L total nitrogen • 30 µg/L nitrite + nitrate • <1.0 µg/L ammonia	• 25 percent reduction in long term nitrogen and phosphorus loads	303(d)(1)	• Nutrient Management Plan and Total Maximum Daily Load for Flathead Lake, Montana (MT DEQ, December 28, 2001) • *"Water quality data and analyses to aid in the development of revised water quality targets for Flathead Lake, Montana; Phase I of a cooperative study to determine total maximum daily loads of nitrogen and phosphorus."* Open file Report 142-97. Flathead Lake Biological Station, University of Montana, Polson, MT

* An asterisk indicates the waterbody has been included on the State's Section 303(d) list of waterbodies in need of TMDLs.
Flathead Lake Total Maximum Daily Load (US EPA Ref. 8EPR-EP, March 2002)

Parameter:	Total Ammonia-N
Restriction:	Summer April 1 through October 31
Facility:	Whitefish WWTP
Permit Number:	MT0020184
Receiving Water:	Whitefish River
Date:	July 25, 2007

Condition		%	Chronic	Acute	Other
Acute Std, mg/L				1.56	
Chronic Std, mg/L			0.91		
ACR					1.68
Mixing Zone					
7Q10	mgd		11.2		
Chronic MZ	cfs	100	11.2		
Acute MZ	cfs	100		1.12	
Effluent Flow	cfs		1.934	1.934	
Water Quality Std.	mg/L		0.91	1.56	
Background Conc.	mg/L		0.050	0.050	
Wasteload Allocation (from mass balance):					
WLAc	mg/L		5.89		
WLAa	mg/L			10.31	
Long-Term Average -Calc.					
Coeff. Variation (CV)	na				0.73
Percentile	%				95
LTAc, multiplier Table 5-1			0.57		
LTAa, multiplier Table 5-1				0.40	
LTAc	mg/L		3.36		
LTAa	mg/L			4.15	
LTA=min(LTAc, LTAa)	mg/L		3.36	3.36	
AML, multiplier Table 5-2			1.75		
MDL, multiplier Table 5-2				2.48	
			AML	**MDL**	
Final Effluent Limit	**mg/L**		**5.9**	**8.3**	

Comment: 100% of 7Q10 for acute due to diffuser on outfall

Parameter:	Total Ammonia-N
Restriction:	Winter November 1 through March 31
Facility:	City of Whitefish WWTP
MPDES Permit Number:	MT0020184
Receiving Water:	Whitefish River
Date:	June 27, 2007

Condition		%	Chronic	Acute	Other
Acute Std, mg/L				1.56	
Chronic Std, mg/L			1.43		
ACR					1.68
Mixing Zone					
7Q10	mgd		11.2		
Chronic MZ	cfs	100	11.2		
Acute MZ	cfs	100		1.12	
Effluent Flow	cfs		1.934	1.934	
Water Quality Std.	mg/L		1.57	2.64	
Background Conc.	mg/L		0.040	0.050	
Wasteload Allocation (from mass balance)					
WLAc	mg/L		9.48		
WLAa	mg/L			10.31	
Long-Term Average -Calc.					
Coeff. Variation (CV)	na				0.8
Percentile	%				95
LTAc, multiplier Table 5-1			0.57		
LTAa, multiplier Table 5-1				0.40	
LTAc	mg/L		5.41		
LTAa	mg/L			4.12	
LTA=min(LTAc, LTAa)	mg/L		4.12	4.12	
AML, multiplier Table 5-2			1.75		
MDL, multiplier Table 5-2				2.48	
			AML	**MDL**	
Final Effluent Limit	**mg/L**		**7.2**	**10.2**	

Comment: 100% of 7Q10 for acute due to diffuser on outfall

Attachment C.

Month	Year	Total N (lb/day)
January	2002	257.1
February		143.3
March		232.8
April		205.2
May		135.8
June		158.4
July		205.6
August		76.6
September		36.1
October		98.8
November		184.6
December		150.7
January	2003	163.6
February		170.2
March		255.2
April		205.2
May		174.7
June		175.2
July		170.2
August		48.9
September		64.9
October		82.8
November		70.4
December		100.9
January	2004	178.7
February		231.1
March		349.5
April		232.8
May		112.5
June		147.3
July		126.3
August		91.7
September		87.2
October		73.8
November		86.2
December		150.4

January	2005	202.0
February		201.2
March		221.8
April		284.4
May		135.6
June		226.3
July		112.6
August		120.4
September		151.5
October		152.8
November		105.5
December		159.4
January	2006	285.1
February		221.4
March		291.0
April		248.3
May		128.7
June		203.2
July		85.6
August		53.4
September		60.3
October		70.4
November		104.0
December		138.7
January	2007	205.3
February		245.7
n =		62
Average		158.9
Standard Deviation		85.2
Coeffient Variation (CV)		0.54
Maximum - LTA Multiplier *		2.68
Average - LTA Multiplier **		1.72
		TN

*** Maximum Daily Limit (MDL), lb/day**	**425.8**
**** Monthly Average Limit (AML), lb/day**	**273.2**

Source: EPA, 1994, TSD, Table 5.2, MDL 99th Percentile
Source: EPA, 1994, TSD, Table 5.2, AML 99th Percentile, n=4